

Supplementary Table S1. Sample quality.

Sample	Number of Reads	Valid UMIs	Reads Mapped to Probe Set	Fraction Reads in Spots under Tissue	Mean Reads per Spot	Median UMI Counts per Spot	Median Genes per Spot	Genes Detected
1 Week MDA231	263,182,368	100.0%	98.6%	98.9%	47,089	855	447	15,533
2 Week MDA231	320,224,301	100.0%	98.3%	97.7%	49,077	651	347	16,281
2 Week Wild-Type	254,517,220	100.0%	98.5%	98.6%	46,293	676	392	15,823

Supplementary Table S2. Unsupervised global gene clustering. Top expressed genes of each cluster sorted by p-value for the two-week wild-type sample.

Top features	Cluster 1	p-value	fold change	Cluster 2	p-value	fold change	Cluster 3	p-value	fold change	Cluster 4	p-value	fold change	Cluster 5	p-value	fold change
1	Bglap	8.86E-104	13.04	Col2a1	7.19E-44	3.88	Tim p2	1.08E-69	19.77	Tmc c2	4.51E-51	1.72	Il1rn	2.79E-110	93.25
2	Colla1	1.84E-68	3.71	F13a1	5.94E-41	28.49	Igfb p7	7.87E-49	5.58	Igh m	9.86E-49	1.50	Fth1	1.62E-97	48.03
3	Gja1	2.84E-67	11.79	Comp	3.41E-37	3.43	Igfb p5	1.65E-47	16.74	Ank1	1.67E-37	1.95	Ly6e	1.72E-65	16.22
4	Acp5	6.81E-63	12.33	Mgp	2.17E-36	4.96	Mm p2	1.49E-43	6.38	Acta1	7.89E-34	15.61	Lgals3	2.00E-63	73.36
5	Colla2	7.99E-55	2.37	Cst3	1.82E-33	22.71	Com p	3.19E-39	3.86	Lcn2	3.58E-32	1.57	Ctsl	1.44E-49	11.82
6	Id3	4.34E-47	7.25	Alpl	4.44E-26	4.11	Bgn	7.66E-39	9.76	Myh4	1.87E-28	20.71	Psap	3.70E-43	14.96
7	Tnc	1.06E-45	11.06	Ibsp	4.89E-25	6.78	Mxr a8	4.31E-38	8.89	Ckm	5.46E-28	16.02	Crip1	1.07E-42	15.51
8	Ctsk	9.29E-41	6.86	Phospho1	4.16E-23	9.35	Tgfb i	3.40E-33	4.63	Tnn c2	2.52E-27	12.12	Tspo	4.25E-40	8.45
9	Mmp9	1.99E-38	6.70	Chil1	3.66E-19	10.70	Apo e	1.44E-32	12.91	Arh gdib	3.26E-27	1.77	Bst2	4.36E-39	34.77
10	Ckb	2.26E-37	7.06	Ptp4a1	3.14E-18	4.79	Col6 a3	2.81E-27	3.47	Bpg m	7.66E-26	1.52	Nfkb ia	2.20E-38	33.36
11	Sparc	1.64E-34	6.07	Fn1	1.47E-17	1.96	Hspg2	2.46E-26	3.54	Atp2 a1	9.29E-25	19.63	Ctss	6.44E-37	11.55
12	Col1a2	1.94E-34	2.83	Pth1r	1.24E-15	5.48	Col6 a2	5.76E-26	2.85	Myl pf	1.10E-24	7.77	Actb	1.49E-35	3.82
13	Cfh	1.71E-32	8.58	Gpc1	2.49E-13	3.78	Lmn a	4.23E-25	5.02	Ccn a2	3.99E-24	1.82	Ctsd	2.39E-35	16.62
14	Nrp2	7.88E-30	6.22	Chst12	1.27E-09	2.06	Cebp d	6.64E-25	4.89	Cyb b	7.37E-24	1.83	Txn1	1.13E-32	11.03

15	Satb2	6.02E-29	5.91	Timp3	3.00E-08	4.56	Crip1	8.15E-25	2.85	Tnnt3	3.87E-23	13.14	S100a6	1.04E-31	4.83
16	Coll1a1	2.12E-26	5.55	Gpx3	3.19E-08	2.18	Lsp1	3.24E-23	2.16	Fam111a	2.08E-22	1.51	Vim	3.60E-31	12.24
17	Csflr	4.43E-26	13.51	Ckap4	4.36E-07	3.16	Ctsl	4.93E-23	3.55	Pygl	2.10E-22	1.64	B2m	5.78E-30	3.24
18	Serpinf1	5.36E-23	4.31	Lman1	1.25E-06	2.98	Ski	1.65E-22	6.08	Pf4	5.02E-22	1.59	Tapbp	6.48E-30	10.90
19	Lifr	1.25E-21	4.82	Pgam1	5.05E-06	3.25	Gpx3	3.34E-22	3.02	Pvalb	8.67E-21	20.72	Cd44	1.42E-29	9.67
20	Car3	8.88E-21	1.61	Sdc4	1.60E-05	3.07	Lgals1	4.22E-21	4.69	Pdcd4	4.69E-19	1.63	Ifitm3	4.52E-29	11.51
21	Jdp2	1.49E-19	5.67	Fxyd1	2.36E-05	1.78	Fn1	1.05E-20	2.38	Ttn	1.94E-16	7.66	Tgm2	2.07E-28	13.54
22	Slc4a2	2.30E-18	9.58	Rcn3	3.48E-05	2.54	Col5a1	4.07E-20	2.76	Prkcb	7.56E-16	1.52	Ctsb	2.25E-27	11.10
23	Hexa	5.06E-17	3.78	Clint1	2.04E-04	2.30	Clu	6.22E-20	7.43	Eno3	1.42E-15	10.99	Esd	6.66E-27	16.05
24	Hexb	9.40E-17	11.77	Scp2	6.28E-04	1.74	Mgp	7.51E-20	2.44	Ptprc	3.00E-15	2.31	Cyba	9.37E-26	2.32
25	Prex1	3.38E-14	5.41	Rpn1	6.67E-04	1.91	Cd81	3.50E-19	8.25	Cd74	3.23E-15	1.65	Tagln2	4.35E-24	3.55
26	Arsb	1.84E-09	8.05	Npm1	7.17E-04	1.56	Vim	4.80E-19	2.79	Hnrnpul1	8.18E-15	1.54	Ctsz	2.05E-23	9.61
27	Bmp1	3.71E-09	1.94	Mif	0.00105478	1.77	Lum	1.04E-18	3.74	Alox5ap	1.15E-13	1.64	Fcerlg	2.79E-23	2.75
28	Tns3	3.82E-09	2.84	Hnrnpab	0.00124852	1.66	Csrp1	1.44E-17	4.75	Rad23a	1.56E-13	2.21	Junb	7.83E-23	10.11

29	Atp6 v1e1	5.33E -09	3.23	Serpinh 1	0.001 3553 4	2.20	Mtch 1	7.65E -17	5.82	Anx a1	1.71E -12	1.65	C3	1.35E -22	12.61
30	Plxnd 1	6.13E -08	2.93	Hspg2	0.002 7999 3	1.50	Col3 a1	7.92E -17	1.98	Ybx 3	7.10E -12	2.10	Itgb2	2.25E -22	4.31
31	Tme m176 b	8.83E -08	2.53	Rpn2	0.006 6275 1	1.71	Col2 a1	1.88E -14	2.23	Gda	1.07E -11	1.55	Cd30 0lf	2.49E -22	3.69
32	Tcirg 1	1.02E -07	2.82	Dynlrb1	0.009 9381	2.48	Jund	1.94E -14	4.26	Myl 1	1.26E -10	3.08	Gpx1	4.74E -22	1.54
33	Atp5 g3	1.37E -07	2.03	Fgfr1	0.012 6394	1.65	Ctss	8.45E -14	4.08	Pfk m	2.84E -10	4.90	Tgfb1	7.20E -22	5.71
34	Pck2	1.67E -07	1.55	Vcl	0.024 5966 4	2.02	Col4 a1	2.84E -12	3.05	Gpi1	3.94E -10	2.22	Selpl g	1.56E -21	2.30
35	Serpi ne2	2.47E -07	1.68	Eprs	0.030 7776 1	3.14	App	2.98E -12	3.71	Tpm 1	7.61E -10	5.62	Slpi	1.04E -20	4.44
36	Atp6 v0c	4.14E -07	3.17	Ndufb6	0.033 9800 1	1.58	Rgs2	4.95E -12	7.62	Tpm 2	3.38E -08	3.03	Cd36	1.02E -19	4.90
37	Atp6 v1f	8.50E -07	1.77	Selenoh	0.034 7924 9	1.67	Gas6	1.27E -11	1.89	Seri nc3	1.20E -07	2.49	Srgn	2.57E -19	2.15
38	Mdh1	1.47E -06	1.74	231002 2B05Ri k	0.042 1351 1	2.41	Slc6 a6	2.39E -11	3.42	Pyg m	1.44E -07	3.81	Plac8	4.90E -19	1.85
39	Itgb3	1.65E -06	1.98	Brd3	0.048 5360 3	1.77	S100 a6	3.35E -11	1.69	Myh 1	3.20E -07	6.98	Ahna k	6.16E -19	11.53

40	Edem l	2.76E -06	1.76	Cuedc2	0.057 5265 8	1.67	Ctsb	1.98E -10	2.34	Hnr npk	1.52E -06	1.86	Spp1	1.77E -18	8.18
41	Cycl	7.75E -06	1.63	Ebna1b p2	0.059 6127 7	1.70	Col4 a3bp	4.88E -10	4.74	Bsg	1.67E -06	1.64	Stx1 1	5.32E -18	2.73
42	Pcolc e	8.52E -06	1.64	Rabac1	0.083 3374 2	1.95	Mt1	5.44E -10	2.07	Myo 1f	2.30E -06	1.75	Cd68	8.80E -18	8.03
43	Atp1 al	1.10E -05	1.57	Mapk3	0.101 3885 1	1.82	Plva p	9.48E -10	3.96	Flna	2.71E -06	1.88	Rap1 b	2.18E -17	2.42
44	Ahcy ll	1.86E -05	2.40	Srp9	0.113 1749 1	1.63	Thbs 1	1.02E -09	2.30	Car3	1.29E -05	4.53	H2- K1	3.85E -17	12.86
45	Fgfr1	2.01E -05	1.58	Kdelr2	0.117 3278 2	1.59	Cxcl 14	1.12E -09	2.61	Cyb 5a	1.43E -05	1.74	Hk3	4.15E -17	2.06
46	Mmp 13	3.47E -05	2.19	Slpi	0.131 7769 9	2.69	Col5 a2	2.82E -09	1.92	Gsr	2.18E -05	1.79	Tap2	4.99E -17	2.91
47	Tme m176 a	9.15E -05	1.69	Swi5	0.195 4486 6	1.53	B4ga lt1	3.75E -09	2.04	Myb pc2	4.15E -05	2.69	Sqst m1	1.22E -16	8.09
48	Lapt m5	9.74E -05	1.59	Mbnl1	0.223 7195 5	1.74	Il6st	5.60E -09	7.63	Aldo a	4.48E -05	4.19	Lmn a	4.12E -16	5.32
49	Ctsa	1.23E -04	2.16	Hpcal1	0.234 1025 5	1.57	Slc4 0a1	8.17E -09	2.14	Lam tor4	4.87E -05	1.68	S100 a4	4.59E -16	16.64
50	Kctd 12	1.29E -04	1.88	Slc25a5	0.244 3854 8	1.67	Ubc	4.20E -08	1.73	Ezr	1.59E -04	1.66	Fcgr 3	4.77E -16	2.25

51	Cd63	2.57E -04	1.59	Mapk14	0.315 1853 7	1.63	Anx a5	5.77E -08	2.93	H2- Eb1	2.59E -04	1.55	Tnfrs fla	6.00E -16	7.80
52	Atp6 v0b	2.60E -04	1.55	Ppp3ca	0.335 2156 2	2.16	Zyx	9.23E -08	1.53	B2m	5.97E -04	1.68	Plec	7.08E -16	4.33
53	Cox6 a1	3.68E -04	1.73	Psmb4	0.352 9149 2	1.56	Ptms	1.09E -07	2.51	Cdc a4	0.001 0339	1.61	Smo x	8.08E -16	5.12
54	Selen op	4.70E -04	1.52	Serpine 2	0.441 6941 6	1.78	Nfe2 l1	3.37E -07	3.85	H2af z	0.001 1485 1	1.62	Cfl1	1.22E -15	2.73
55	Sdhb	6.98E -04	1.62	Casp3	0.532 1376 3	1.78	Mbt ps1	4.52E -07	1.85	Cnp	0.001 4455 8	1.56	Nadk	1.60E -15	5.91
56	Srsf9	0.002 7798 4	1.54	Snf8	0.536 7066 8	2.40	Ww p2	6.05E -07	3.04	Dnm t1	0.002 9059 5	4.03	Lgals 9	1.67E -15	3.08
57	Parvb	0.003 4697 1	2.38	Casq1	0.538 2353 8	2.79	Upf1	1.28E -06	2.93	Srsf 11	0.004 017	8.98	Grn	3.56E -15	6.62
58	Gusb	0.006 6241	2.92	Usf2	0.590 9362 4	1.60	Prka cb	1.63E -06	5.07	Tra m1	0.004 2758 3	1.54	H3f3 b	5.48E -15	2.30
59	Mgat 4b	0.012 4339 1	2.35	Calm2	0.652 0762 2	1.59	Lapt m4a	1.86E -06	1.54	Atp5 a1	0.005 4682	1.58	Npc2	6.07E -15	2.95
60	Ak2	0.018 4895 4	1.69	Atp2c1	0.703 4400 8	1.53	Junb	1.86E -06	2.23	Trir	0.007 3026 7	1.86	Aldh 3b1	1.00E -14	3.03
61	Sec6 la1	0.018 9632 2	1.51	Stx4a	0.748 4193 2	3.41	Fabp 4	2.13E -06	2.31	Slc4 8a1	0.007 4757 5	1.55	Sod2	1.23E -14	9.14

62	Atp6 v0e	0.019 7409 7	2.08	Xpnpep 1	0.754 3726 1	1.77	Sdf2	2.39E -06	1.95	Ube 2s	0.008 9622 1	1.93	Alox 5ap	1.42E -14	1.77
63	Scan d1	0.031 0617 4	1.51	Mt1	0.825 4511 5	1.51	Ana pc5	2.45E -06	1.65	Ywh az	0.009 9959 3	1.68	Btg1	1.63E -14	3.14
64	Sh3k bp1	0.034 3719 5	1.74	Lyn	0.879 2745 6	4.14	Orai 1	2.52E -06	1.63	Ubr 3	0.017 7261 6	1.54	Clic1	1.74E -14	3.75
65	Map2 k3	0.049 4689	1.50	Maf	0.906 9210 1	1.89	Ctsd	2.65E -06	2.25	Mpc 2	0.028 5457 8	1.52	Gna1 3	1.83E -14	3.83
66	Vapa	0.080 8290 5	1.59	Uba2	0.926 8809 4	1.54	Eng	2.86E -06	2.55	Gtf2 i	0.039 2164 5	2.87	Fxyd 5	1.91E -14	5.52
67	Crebz f	0.089 0157 7	1.95				Colg alt1	4.10E -06	3.30	Skp 1a	0.039 6289 2	1.78	Litaf	2.74E -14	3.98
68	Oxct 1	0.145 4443 6	2.03				Anx a6	5.24E -06	2.41	Oaz 1	0.184 6284 9	1.87	Msn	4.08E -14	4.11
69	Naa5 0	0.253 9117 7	1.78				Sptb n1	6.79E -06	1.67	Myl 12a	0.283 5835 1	2.37	Msrb 1	4.35E -14	1.81
70	Dcaf 12	0.271 8793 7	1.62				Tsc2 2d3	8.36E -06	1.90	Mga t1	0.382 2569 9	1.57	Esyt 1	7.28E -14	2.38
71	Bex3	0.304 1756 3	2.72				Sdc4	9.29E -06	1.95	Hnr npm	0.387 9031 4	1.74	Ezr	2.53E -13	3.04
72	Actr1 a	0.320 4810 3	2.66				Cdc4 2se1	1.73E -05	5.94	Sfpq	0.398 2879 3	1.91	Tyro bp	1.54E -12	2.38

73	Tmem131	0.342 7333 8	1.64				Myolc	1.90E -05	1.61	Ifitm3	0.490 691	2.45	Cd47	1.84E -12	1.96
74	Cbx1	0.365 3231 5	1.56				Cbfb	2.82E -05	2.39	Plec	0.503 2512 5	2.11	Btg2	2.82E -12	1.79
75	Prdx4	0.387 9852 4	1.89				Ccnl2	3.93E -05	2.20	Numal	0.568 8083 5	2.43	Cd52	3.65E -12	1.65
76	Nisch	0.406 3098 2	1.54				Tcp1l12	4.64E -05	1.85	Colgalt1	0.667 7135 8	1.58	Mpeg1	3.77E -12	3.09
77	Macf1	0.457 3818	1.70				Tmem165	5.00E -05	1.50	Wwp2	0.741 9120 4	1.62	Psme1	3.88E -12	2.38
78	Ndufs4	0.459 2960 6	1.78				Cat	5.63E -05	1.55	Rer1	0.989 5598 9	4.37	Anxa2	4.69E -12	3.27
79	R3hdm4	0.543 7674 4	1.53				Ostf1	8.61E -05	1.68				Calm1	8.02E -12	3.71
80	Rgl2	0.574 7811 1	2.83				Adipor1	1.02E -04	3.33				Plekho2	1.80E -11	2.50
81	Bclaf1	0.630 6403	2.40				Lamp1	2.69E -04	2.58				Mxd1	2.91E -11	2.29
82	Eif4ebp1	0.750 5554 2	1.60				Tapbp	2.85E -04	1.69				Myo1f	3.69E -11	2.99
83	Nktr	0.870 5181 6	2.30				Fcgr3	2.92E -04	1.71				Grina	4.24E -11	1.91

84	Preb	0.950 8834	1.52				Raba c1	2.94E -04	2.49				Sdcb p	6.18E -11	1.91
85							Cct3	3.19E -04	1.86				Apbb lip	1.45E -10	1.93
86							Prre 2a	3.54E -04	1.69				Myl1 2a	1.57E -10	4.99
87							Actn 1	3.97E -04	3.93				Col6 a3	1.58E -10	2.85
88							Traf 7	4.55E -04	2.37				Pkm	1.95E -10	2.41
89							Ywh aq	6.14E -04	2.63				Csf3r	2.94E -10	10.33
90							Rnh 1	6.35E -04	1.88				Capz a2	3.17E -10	3.55
91							Sh3p xd2b	8.82E -04	2.05				Gch1	3.34E -10	1.52
92							Lim d1	9.00E -04	1.56				Pfn1	3.67E -10	1.72
93							Plpp 3	9.19E -04	2.64				Capg	5.82E -10	3.33
94							Stk2 5	0.001 0955 2	1.58				Arpc 3	1.00E -09	1.99
95							Rp2	0.001 2745 4	3.27				Cxcl 14	1.02E -09	7.21
96							Epn1	0.002 0541 6	4.62				Axl	1.57E -09	7.62
97							Slc2 5a4	0.002 0847 2	2.61				BC0 0553 7	2.53E -09	4.72

98							Sar1 a	0.002 1554 2	2.08				Slc1 4a1	2.56E -09	1.53
99							2- Sep	0.002 2191 3	1.64				Mcl1	2.71E -09	2.12
100							Map 7d1	0.002 6352 9	2.07				Igfbp 7	3.17E -09	2.32
101							Arf1	0.002 7756 5	1.81				Myo 1c	3.27E -09	4.56
102							Tcp1	0.002 8770 1	1.91				Gusb	6.57E -09	2.18
103							Ddx 6	0.003 0474 4	1.55				Pical m	8.43E -09	8.90
104							Wdr 61	0.003 3582 5	1.54				Chm p4b	9.47E -09	7.55
105							Fis1	0.003 6403	1.53				Psmb 9	1.00E -08	2.23
106							Eif3 h	0.004 2976	2.01				Tnfai p2	1.18E -08	5.93
107							Gak	0.004 6333 9	2.19				Atp6 ap2	1.91E -08	2.18
108							Rgcc	0.005 2166 5	4.05				Prdx 5	1.93E -08	2.02
109							Dctn 3	0.005 3379	1.73				Mdm 2	2.27E -08	5.51

110							Itgb1	0.006 2205 7	1.59				Rnh1	4.52E -08	7.42
111							Msl1	0.006 4000 9	1.55				Apoe	6.05E -08	2.65
112							Ptpa	0.006 8947 3	1.65				Col6 a2	7.26E -08	2.09
113							Rab1 la	0.007 0705	1.90				Clec 2d	9.90E -08	1.64
114							Anx a2	0.007 8292 8	1.55				Glipr 2	1.03E -07	4.34
115							Klf1 3	0.009 1602 5	1.50				Col4 a1	1.11E -07	2.60
116							Cdk 4	0.009 2419 1	1.67				Cd9	1.48E -07	3.48
117							Tme d3	0.009 7469 1	3.98				Ehbp 111	1.52E -07	2.19
118							Lam p2	0.010 1943 6	1.75				Gda	1.66E -07	2.11
119							Hnrn pf	0.010 7336	2.93				Glud 1	1.68E -07	3.16
120							Ralb p1	0.011 1088	2.67				Stard 7	1.73E -07	2.72
121							Tnpo 1	0.011 4240 5	1.52				Zyx	1.75E -07	1.87

122							Hsd1 7b11	0.011 5899 4	1.80				Ucp2	1.82E -07	2.15
123							Snx5	0.012 0649 9	1.64				Efhd 2	2.21E -07	5.63
124							Cenp b	0.013 8730 2	1.97				Klf1 3	2.74E -07	2.11
125							2- Mar	0.015 8815	1.76				Arhg dia	3.13E -07	1.53
126							Pdcd 6ip	0.016 3964 8	1.79				Cltc	4.40E -07	1.58
127							Srsf6	0.017 7723	1.64				Cotl1	4.97E -07	2.37
128							Atp2 a2	0.020 5867 3	1.51				Trpv 2	5.33E -07	1.69
129							Ppic	0.020 8768 3	1.52				Tln1	5.69E -07	1.88
130							Sri	0.027 7500 8	1.72				Col3 a1	5.94E -07	1.79
131							Myc bp2	0.028 4888 9	1.51				Rhog	9.88E -07	1.70
132							Myh 1	0.029 9783 3	2.07				Plpp 3	1.07E -06	3.31

133							Dad 1	0.033 1225 9	2.18				Akna	1.16E -06	1.60
134							Ube 4b	0.034 5654 2	2.16				Atp6 v0c	1.26E -06	1.80
135							Lrp1 0	0.037 5693 9	2.16				Anxa 5	1.31E -06	4.91
136							Cdc4 5	0.039 9548 8	1.55				Gdi2	1.64E -06	1.91
137							5- Sep	0.041 0620 7	1.78				H2- T23	1.81E -06	1.70
138							Ttn	0.042 6924 9	2.15				Atox 1	1.95E -06	3.87
139							Glud 1	0.048 5462 1	2.44				Marc ksl1	2.22E -06	3.01
140							Egln 2	0.056 2760 1	1.86				Slfn2	2.32E -06	1.75
141							Idh2	0.056 4826 4	1.87				Mif	2.97E -06	2.29
142							Pxk	0.059 5675 2	1.92				Cast	3.41E -06	2.13
143							Kif1 c	0.065 9196 8	2.85				Dcn	4.50E -06	5.65

144							Psm c3	0.065 9317 7	2.54				Atp6 v0e	4.73E -06	2.39
145							Eif4 a1	0.066 1567	1.76				Fn1	4.87E -06	1.75
146							Ssr3	0.073 245	2.06				Diap h1	5.63E -06	1.56
147							Pole 4	0.077 9970 1	2.04				Anxa 7	5.76E -06	2.19
148							Tme m12 7	0.084 5829 6	1.55				Sptlc 2	5.88E -06	1.96
149							Myl 1	0.096 2775 2	2.29				Lrp1 0	6.05E -06	2.05
150							Ubr4	0.103 6370 2	1.58				Unc9 3b1	7.17E -06	2.03
151							Papo la	0.106 1842 9	1.98				Lpga t1	8.47E -06	2.15
152							Gna 12	0.106 2377 1	1.53				Sh3g lb1	8.48E -06	2.19
153							Pyg m	0.107 0387 3	2.86				Vps2 6a	1.00E -05	2.05
154							Ilrun	0.112 6186 8	3.88				Lgals 1	1.02E -05	2.78

155							Aldo a	0.114 4574 6	2.33				Itga m	1.02E -05	1.71
156							Mpri p	0.123 8798 5	2.17				S100 a11	1.07E -05	1.70
157							Arpc 1b	0.130 9506 4	1.62				Wdr 1	1.20E -05	2.20
158							Mkn k2	0.169 3241 9	1.81				Nplo c4	1.35E -05	2.44
159							Pgp	0.198 2358 3	4.25				Sh3b grl3	1.40E -05	2.33
160							Myb pc2	0.202 0470 2	3.50				B4ga lt1	1.42E -05	3.47
161							Actn 3	0.208 3458 1	5.34				Actn 1	1.65E -05	1.66
162							Lapt m5	0.219 8687 6	1.87				Ankf y1	1.95E -05	1.98
163							Get4	0.235 1512 1	1.56				Myh 9	1.97E -05	1.58
164							Hnrn ph2	0.244 1547 9	1.70				Selen ot	2.13E -05	2.04
165							Igsf6	0.273 1173 7	6.28				Capn 2	2.16E -05	1.97

166							Atp6 ap1	0.295 5041 6	2.16				Pga m1	2.31E -05	1.74
167							Ranb p9	0.300 5792 4	1.58				Gnb2	2.38E -05	1.87
168							Tbrg 1	0.324 8875 2	1.71				Usp2 5	2.43E -05	1.71
169							Psm d2	0.346 5605 5	1.56				Spi1	2.60E -05	2.36
170							Atp5 o	0.349 2058 7	2.32				Pim1	2.73E -05	2.19
171							Parp 1	0.405 5069 3	1.69				Znrf 1	2.79E -05	1.96
172							Pspc 1	0.461 8410 9	3.03				Tme m25 9	3.28E -05	1.87
173							Nduf v2	0.510 3910 3	1.85				Csrp 1	3.84E -05	3.33
174							Hsbp 1	0.526 8459	2.61				Riok 3	3.87E -05	1.52
175							Uqcr h	0.561 2111 5	1.76				Emp 3	4.90E -05	2.60
176							Myl pf	0.570 5799 4	2.44				Pitpn a	5.29E -05	1.85

177							Ino8 0e	0.716 2037	1.83				Hmo x1	5.86E -05	10.18
178							Arcn 1	0.777 4405 7	1.69				Vdac 2	5.90E -05	2.54
179							Pdha 1	0.927 0345 4	1.63				Plva p	6.33E -05	3.85
180							St3g al1	0.960 4094 6	1.53				Rab1 la	6.45E -05	1.89
181													Rtf2	6.55E -05	1.87
182													Fkbp la	8.16E -05	2.33
183													Fli1	8.73E -05	2.48
184													Acsl 5	8.78E -05	2.14
185													Flot2	9.04E -05	2.77
186													Polr2 j	1.24E -04	2.40
187													Spec c1	1.24E -04	1.79
188													Nsd2	1.48E -04	1.60
189													Pdcd 6ip	1.67E -04	1.81
190													Ppt1	1.83E -04	2.33
191													Actr 3	1.87E -04	2.54

192													Adgr e5	1.87E -04	1.58
193													Ywh ag	1.89E -04	2.48
194													Bag1	1.90E -04	1.77
195													Grb2	1.99E -04	1.94
196													Zc3h av1	2.10E -04	1.91
197													Rab5 c	2.30E -04	1.55
198													Dbi	2.33E -04	1.54
199													Eng	2.38E -04	4.64
200													Plxn d1	2.55E -04	1.92
201													Ddx5	2.65E -04	1.65
202													Tbc1 d2b	2.65E -04	3.63
203													Canx	2.79E -04	1.89
204													Nap1 l4	3.01E -04	2.22
205													Arel 1	3.05E -04	2.59
206													Vasp	3.12E -04	1.69
207													Iqga p1	3.25E -04	1.57

208													H2- Eb1	3.28E -04	2.04
209													Ostf1	3.52E -04	1.86
210													Akr1 a1	3.65E -04	2.06
211													Ebna 1bp2	3.67E -04	2.59
212													Atp6 v0b	4.08E -04	1.75
213													Psemb 3	4.37E -04	2.01
214													Mif4 gd	4.59E -04	4.98
215													Cebp d	4.67E -04	3.07
216													Srrt	4.68E -04	1.58
217													Spsb 3	4.71E -04	1.60
218													Cct2	4.72E -04	1.61
219													Pcmt 1	4.86E -04	1.62
220													Gls	5.00E -04	1.62
221													Lmbr d1	5.37E -04	2.17
222													Csnk 1a1	5.89E -04	1.76
223													Ssna 1	6.31E -04	4.09

224													Syng r2	6.33E -04	6.74
225													Mtpn	6.34E -04	2.99
226													Ank	6.60E -04	6.40
227													Lrrfi p1	7.03E -04	1.53
228													Hsp9 0b1	8.11E -04	1.80
229													Hist1 h2bc	9.21E -04	2.72
230													Sirpa	0.001 0149 4	1.53
231													Hsd1 7b11	0.001 0659 7	1.80
232													Bptf	0.001 1148	1.79
233													Nfe2 l2	0.001 2433 7	1.50
234													Rhoa	0.001 4149 4	4.07
235													Vsir	0.001 4437 7	2.51
236													Psmc 4	0.001 5236 9	2.11

237													Ranb p9	0.001 5286	1.62
238													Capn 1	0.001 7260 1	1.77
239													Ago2	0.001 8437 7	1.76
240													Uqcr 11	0.002 0248 9	1.93
241													Irf2b p2	0.002 0902 5	1.84
242													Spop	0.002 3320 4	1.86
243													Psmb 2	0.002 4176 6	2.73
244													Arf6	0.002 5788 3	1.58
245													Sdf2	0.002 6326 7	1.70
246													Map k3	0.002 6520 5	1.71
247													Fbx w11	0.002 7789	1.73

248													Ncf4	0.003 0582 8	1.70
249													Cnot 8	0.003 1530 1	1.72
250													Psmc 6	0.003 5074 2	1.68
251													Kat6 a	0.003 5146 8	1.70
252													Fkbp 8	0.004 2679 4	1.54
253													Col5 a1	0.004 4391 9	1.54
254													Map 3k3	0.004 552	5.97
255													Sdha	0.004 5670 8	1.86
256													Arpc 4	0.004 7043 5	2.52
257													Sars	0.005 1631 1	1.72
258													Ptpn 1	0.005 4417 5	1.87

259													Hspg 2	0.005 6539 9	1.73
260													Mia2	0.005 8235 6	2.47
261													Cct6 a	0.005 9916 3	11.69
262													Capn s1	0.006 0063 8	2.03
263													Get4	0.006 3953 8	1.93
264													Tcf2 5	0.007 2946 4	1.82
265													Htra 2	0.007 3045 6	2.19
266													Lyp1 a2	0.007 8206 6	2.12
267													Atp2 a2	0.007 9325 3	1.81
268													Ptbp 1	0.008 1341 7	1.77
269													Gaba rap12	0.009 0322	1.60

270													Hbp1	0.009 7106 1	1.71
271													Med 13l	0.009 9487 6	1.79
272													Ogdh	0.011 5970 2	3.08
273													Ppp6 rl	0.012 5518 4	2.24
274													Pgk1	0.012 7102 6	3.94
275													Eif2s 2	0.013 6305 8	1.70
276													Cyb5 a	0.013 7490 7	1.53
277													Tram 1	0.014 3008 3	1.77
278													Tcirg 1	0.016 0317 1	2.09
279													Tsc2 2d3	0.017 2299 9	1.97
280													Tme ml3 4	0.017 5021 8	1.52

281													Mbd 3	0.017 7708 4	1.52
282													Flna	0.017 9425 6	1.67
283													Bcl2l 1	0.018 1136 4	1.57
284													Psma 2	0.019 1540 8	3.41
285													Zmat 2	0.019 5073 7	3.47
286													Traf7	0.022 3382 5	1.71
287													Dnaj b1	0.029 9636 2	1.50
288													Stx1 6	0.033 1499 7	1.51
289													Cops 7a	0.034 6510 3	2.08
290													Sync rip	0.035 7136 1	1.64
291													Tsc2 2d1	0.035 9126 5	5.90

292													Tm9 sf2	0.037 1328 7	2.40
293													Nme 1	0.038 3304 2	1.95
294													Map 7d1	0.038 5154 5	1.52
295													U2af 1	0.039 4074 5	1.75
296													Eif4g 2	0.040 2235 5	1.52
297													Nduf b1-ps	0.042 1714 5	1.53
298													Psen en	0.045 7264 7	2.35
299													Ppp2 ca	0.053 9394 5	3.73
300													Suds 3	0.055 2422 4	1.87
301													Lyst	0.056 8017 4	1.51
302													Cdkn 2c	0.058 3771 5	1.60

303													Ap2a 2	0.058 4554 6	1.51
304													Pkn1	0.058 9965 6	1.63
305													Mob 1a	0.059 9763 7	4.82
306													Snrp e	0.064 5961 5	2.32
307													Hexa	0.065 4926 8	1.74
308													Ppp2 r5c	0.066 7834 4	1.85
309													App	0.071 6705 2	1.82
310													Ptpn 11	0.075 8450 8	1.63
311													Sh3b grl	0.078 6915	1.62
312													Wnk 1	0.079 3694 6	1.76
313													Ptpn 12	0.080 4127 1	1.99

314													Szrd 1	0.087 4136 5	1.61
315													Pafa h1b1	0.088 7772 2	1.55
316													Actr 10	0.091 4118 7	2.25
317													Dctn 2	0.094 1726 8	1.59
318													Tubb 4b	0.121 2657 3	1.65
319													Ptms	0.122 7660 5	1.67
320													Psmb 7	0.126 7646 6	1.65
321													Tra2 a	0.131 2282 2	2.32
322													Fam 168b	0.141 4183 7	1.79
323													Cma s	0.145 5690 8	1.86
324													Ube2 b	0.183 0631 9	1.62

325													Pds5 a	0.189 0358 9	1.69
326													Nars	0.210 1245 2	1.64
327													Vars	0.214 0980 2	1.65
328													Mtor	0.222 9994 3	1.67
329													Surf4	0.228 0435 4	2.12
330													Orai 1	0.232 5344 3	1.58
331													Atp1 a1	0.248 1251 6	1.77
332													Vps3 5	0.251 7792 6	1.65
333													Cpsf 6	0.252 4707 6	2.05
334													Sri	0.279 8421	1.59
335													Itm2 c	0.286 3371 1	1.77

336													Stt3b	0.332 4330 4	1.53
337													Ppp1 r8	0.387 3692 6	1.67
338													Atp5 c1	0.388 8033 4	2.03
339													Supt 5	0.416 0473 7	1.69
340													Eif3l	0.447 8203	1.82
341													Nduf b8	0.491 5338 7	2.40
342													Kidi ns22 0	0.495 6792 8	2.02
343													Asap 1	0.708 1681 8	1.61
344													Mtch 1	0.771 3583 6	1.63
345													Ubal d2	0.810 2584 4	1.58
346													Uqcr h	0.865 1378 3	1.59

347													Marks	0.895 3677	2.67
348													Ssr3	0.906 9953 6	1.83
349													Ppic	0.930 6925 9	1.53
350													Ndufa2	0.978 6105 5	3.02

Supplementary Table S3. Unsupervised global gene clustering. Top expressed genes of each cluster sorted by p-value for the two-week MDA-MB-231 sample.

Top features	Cluster 1	p-value	fold change	Cluster 2	p-value	fold change	Cluster 3	p-value	fold change
1	Col1a2	4.08E-97	2.89	Col3a1	1.38E-93	5.34	Col2a1	1.26E-177	51.98
2	Col1a1	1.89E-71	2.79	Crip1	1.13E-56	16.42	Col9a1	1.02E-152	39.51
3	Bglap	1.15E-38	11.72	Col6a2	4.58E-56	6.15	Col9a3	1.63E-136	39.80
4	Acp5	1.83E-33	5.47	Tnn	6.68E-55	14.98	Comp	3.28E-97	19.55
5	Dmp1	7.87E-33	5.32	Lmna	1.65E-54	6.10	Col9a2	4.10E-89	16.79
6	Ctsk	6.96E-32	6.78	Acta1	3.53E-49	9.94	Acan	6.10E-76	20.68
7	Col11a2	8.61E-30	2.85	Col6a1	6.56E-49	6.19	Mgp	5.94E-69	13.58
8	Nrp2	3.02E-28	2.54	Vim	6.20E-48	7.84	Cst3	6.63E-29	6.10
9	Gja1	1.85E-25	2.30	Tgfb1	4.16E-47	8.86	Ccdc80	1.63E-21	3.42
10	Id3	6.59E-24	2.27	Ecm1	7.86E-45	12.80	Smoc2	1.74E-17	6.77
11	Ckb	9.08E-22	3.69	Aebp1	1.33E-43	7.23	Cspg4	2.63E-17	2.20
12	Col22a1	3.15E-20	2.41	Thbs2	1.72E-43	6.83	Rbp4	1.50E-16	4.65
13	Mmp9	6.25E-16	1.89	Col6a3	5.37E-43	5.74	Fn1	1.75E-10	2.14
14	Col11a1	1.37E-12	1.90	Col5a1	1.62E-42	3.15	Sdc4	2.68E-08	2.48
15	Ptgis	3.34E-11	1.82	Postn	2.70E-41	5.48	Alpl	3.80E-08	1.73
16	Creb3l1	2.04E-10	2.47	Tnnc2	4.66E-41	7.37	Col16a1	1.21E-07	1.87
17	Phospho1	3.12E-10	2.28	Ckm	4.11E-37	7.31	Gpc1	4.70E-07	2.25
18	Csflr	1.35E-09	2.89	Mylpf	1.85E-35	6.94	Emilin1	5.46E-07	2.17
19	Cd68	9.40E-08	1.89	Angptl2	1.47E-34	5.08	Igfbp7	1.57E-06	1.89
20	Ibsp	7.26E-07	2.34	Mmp2	1.23E-32	4.37	Fscn1	0.00258535	1.67
21	Hexa	2.63E-06	1.81	S100a6	3.92E-32	4.76	Fibin	0.00853956	1.66
22	Spp1	4.58E-06	2.52	Aldoa	1.53E-31	2.92	Mmp9	0.23071441	1.60
23	Tmem176b	1.95E-05	1.86	Fn1	1.96E-30	2.48	Maged1	0.29991692	1.55
24	Hba-a2	1.93E-04	1.91	Plec	3.54E-28	3.30	Fgfr1	0.34024572	1.58

25	Atp6v0e	0.00199742	1.79	Igfbp7	5.98E-28	2.05	Hnrnpab	0.35671937	1.69
26	Hbb-bs	0.00260241	1.56	Fstl1	3.13E-27	5.08	Mt1	0.56442893	1.71
27	Mmp13	0.00487388	1.78	Timp2	1.39E-26	4.30			
28				Tnnt3	2.20E-26	4.61			
29				Ybx3	1.77E-25	3.25			
30				Ahnak	3.54E-25	3.23			
31				Myh4	8.57E-25	5.55			
32				Lgals1	1.24E-24	2.75			
33				Igfbp5	1.53E-24	4.93			
34				Fth1	2.70E-24	4.20			
35				Loxl2	2.72E-22	4.40			
36				Lgals3	1.23E-21	4.67			
37				Bgn	2.44E-19	2.23			
38				Ctsl	3.64E-19	3.49			
39				Emp1	8.20E-19	3.44			
40				Hspg2	2.77E-18	2.25			
41				Tagln2	2.85E-18	2.65			
42				Fibin	5.75E-18	3.20			
43				Txn1	1.29E-17	2.53			
44				Nbl1	1.82E-16	2.15			
45				Lum	3.74E-16	2.23			
46				Antxr1	1.00E-14	2.68			
47				Jund	1.89E-14	2.00			
48				Cthrc1	4.96E-14	2.26			
49				Col4a2	7.92E-14	4.09			
50				Tuba1a	8.52E-14	1.91			
51				Ski	9.86E-14	2.10			
52				Col12a1	1.52E-13	2.33			

53				Cd81	1.85E-13	2.01			
54				Col4a1	6.35E-13	4.04			
55				Pkm	9.44E-13	2.56			
56				Myo1c	2.97E-12	2.49			
57				Cd44	5.09E-12	3.17			
58				Tnfrsf1a	8.69E-12	2.32			
59				Apoe	1.30E-11	3.67			
60				Ywhag	3.48E-11	2.31			
61				Pmepa1	2.59E-10	1.64			
62				Ctsb	1.27E-09	1.84			
63				Col16a1	2.65E-09	1.92			
64				Tpm1	3.04E-09	2.27			
65				Actb	1.01E-08	1.89			
66				Mxra8	1.48E-08	1.90			
67				Psap	2.49E-08	1.96			
68				C1qtnf6	3.11E-08	1.60			
69				Cd47	9.60E-08	2.48			
70				Mtch1	1.43E-07	2.13			
71				Sqstm1	1.75E-06	1.87			
72				Gpi1	3.08E-06	2.01			
73				Rap1b	5.49E-06	2.12			
74				Plvap	8.20E-06	2.10			
75				Dcn	3.28E-05	1.66			
76				Gpx1	3.68E-05	2.22			
77				Tnfaip2	5.18E-05	1.50			
78				Msn	5.46E-05	1.56			
79				Ywhaz	1.14E-04	1.70			
80				Nid2	1.16E-04	1.53			

81				Pdia3	1.31E-04	1.71			
82				Ubc	1.89E-04	1.69			
83				Ctsd	0.00139589	1.51			
84				Hist2h2bb	0.00468357	1.63			
85				Hnrnpm	0.0159233	1.66			
86				Ube2m	0.01888249	1.58			
87				Calm1	0.02370051	1.58			
88				Pgam1	0.03051486	1.56			
89				Ssr3	0.07433097	1.50			
90				Car3	0.75330208	2.05			

Supplementary Table S4. Unsupervised global gene clustering. Top expressed genes of each cluster sorted by p-value for the one-week MDA-MB-231 sample.

Top features	Cluster 1	p-value	fold change	Cluster 2	p-value	fold change
1	Tgfb1	1.99E-18	11.30	Col1a2	5.01E-22	1.77
2	Col6a2	3.80E-18	7.72	Col1a1	1.03E-19	2.63
3	Fn1	2.56E-17	5.36	Mmp9	7.71E-18	4.91
4	Tnn	1.60E-16	14.95	Acp5	4.20E-15	5.22
5	Col3a1	2.49E-16	3.08	Dmp1	5.87E-15	2.20
6	Angptl2	1.48E-12	7.47	Col22a1	2.34E-13	2.18
7	Aebp1	2.26E-12	11.05	Ckb	7.53E-13	8.19
8	Col6a1	1.82E-11	6.14	Car3	2.88E-12	2.99
9	Crip1	6.07E-11	6.41	Gja1	6.98E-12	2.21
10	Thbs2	7.37E-11	8.36	Ctsk	2.53E-11	4.60
11	Col6a3	1.10E-10	3.17	Mmp13	3.19E-10	11.81
12	Lmna	2.71E-10	2.71	Slc4a2	4.40E-08	4.55
13	Postn	4.21E-10	13.52	Nrp2	8.11E-08	1.97
14	Igfbp7	6.72E-10	1.87	Hexa	9.08E-08	2.50
15	Fth1	1.33E-08	2.15	Id3	7.35E-07	1.66
16	Col5a1	1.66E-08	3.67	Gpc1	2.97E-06	1.62
17	Fibin	3.65E-08	3.91	Bglap	4.13E-06	4.51
18	S100a6	4.53E-08	3.11	Ptgis	7.46E-06	3.06
19	Bgn	1.01E-07	2.50	Atp6v1e1	2.48E-05	2.44
20	Pmepa1	1.80E-07	2.69	Sh3pxd2b	6.38E-05	1.71
21	Acan	1.82E-07	11.90	Spp1	1.33E-04	2.32
22	Comp	6.41E-07	13.75	Tnnc2	2.60E-04	2.25
23	Emilin1	8.03E-07	3.40	Cyc1	0.00143806	1.74
24	Col9a3	1.37E-06	15.71	Ctsz	0.00196439	1.88

25	Grb10	2.67E-06	4.08	Cd68	0.00370229	1.88
26	Smoc2	2.69E-06	1.88	Ckm	0.00448134	1.89
27	Pdia3	3.57E-06	2.06	Tmem176b	0.0060072	1.63
28	Igfbp5	1.22E-05	2.20	Creb3l1	0.0063904	1.68
29	Mgp	1.34E-05	6.62	Tnnt3	0.00884771	2.53
30	Mmp2	1.40E-05	1.87	Ctsa	0.00884807	1.60
31	Jund	3.22E-05	2.36	Uqcrc1	0.01471704	1.52
32	Fstl1	4.23E-05	3.58	Myh4	0.01853007	1.91
33	Col9a1	4.73E-05	14.00	Mylpf	0.02335842	1.76
34	Tagln2	5.07E-05	2.32	Ahcyl1	0.04906869	1.51
35	Myo1c	5.56E-05	1.98	Slc39a7	0.06207363	1.85
36	Apoe	5.90E-05	9.98	Atp6v0e	0.11104512	1.51
37	Loxl2	6.33E-05	3.39	Tnc	0.27646613	1.97
38	Timp2	6.77E-05	1.76	Hist4h4	0.49098454	1.64
39	Pkm	8.52E-05	1.89	Slc25a5	0.59083628	2.06
40	Cd81	1.12E-04	1.94	Mt1	0.62433476	1.54
41	Hspg2	1.55E-04	1.79			
42	Hsp90b1	1.79E-04	1.56			
43	Col9a2	2.35E-04	10.28			
44	Tuba1a	3.51E-04	2.44			
45	Ppib	4.21E-04	1.77			
46	Ckap4	4.52E-04	1.56			
47	Surf4	5.01E-04	1.53			
48	Ctsl	5.13E-04	2.50			
49	Sdc4	8.16E-04	2.73			
50	Ddb1	0.00110138	1.63			
51	Thbs1	0.0012533	1.57			
52	Col2a1	0.00125895	8.18			

53	Vim	0.00223164	1.79			
54	Myl12a	0.00282791	1.72			
55	Cthrc1	0.00332182	1.66			
56	Ctsb	0.00384687	3.23			
57	Mtch1	0.00482792	2.05			
58	Rbp4	0.00510327	3.41			
59	Fscn1	0.00574327	1.76			
60	Tmsb4x	0.00628898	2.22			
61	Col12a1	0.00633081	2.23			
62	Sar1a	0.00690348	1.50			
63	Tnfrsf1a	0.0081746	1.63			
64	Lgals1	0.00916693	1.84			
65	Rabac1	0.00998772	1.62			
66	Rer1	0.01183203	1.70			
67	H2afz	0.01385191	1.69			
68	Txn1	0.01447579	1.94			
69	Maged1	0.01690518	1.51			
70	Arhgdia	0.02055006	1.66			
71	Plec	0.0235455	1.99			
72	Ptbp1	0.03015833	1.57			
73	Gpi1	0.03269063	2.08			
74	Cspg4	0.03691878	3.25			
75	Ecm1	0.04542868	1.66			
76	C1qtnf6	0.06759725	2.13			
77	Nbl1	0.06965241	1.92			
78	App	0.10396289	1.57			
79	Akt1	0.16513958	1.53			
80	Sfpq	0.19742708	1.65			

81	Lgals3	0.24769173	1.74			
82	Gnb2	0.51315775	1.62			

Supplementary Table S5. Complete differential gene list of the comparison of the two-week MDA-MB-231 hard callus and the two-week wild-type hard callus. Gene list calculated by ANOVA and filtered by p-value <0.05, false discovery rate (FDR) <0.01, and fold change at least from -1 to 1.

Gene	P-value	FDR step up	Ratio	Fold change	LSMean(MDA- 231)	LSMean(WT)
Acta1	1.01E-18	2.92E-16	4.38E-01	0.44	-2.28	2.40
Sem1	8.59E-17	1.24E-14	1.64E+00	1.64	1.64	4.33
Ckm	7.27E-16	7.00E-14	5.57E-01	0.56	-1.80	1.78
Hba-a2	4.64E-14	3.35E-12	2.28E+00	2.28	2.28	3.60
Tnnc2	4.93E-12	2.85E-10	6.58E-01	0.66	-1.52	2.15
Aldoa	8.33E-11	4.01E-09	7.22E-01	0.72	-1.39	2.08
Mylpf	2.51E-10	1.04E-08	7.11E-01	0.71	-1.41	1.46
Pgam2	1.10E-09	3.97E-08	8.03E-01	0.80	-1.25	1.06
Pvalb	4.20E-09	1.35E-07	7.53E-01	0.75	-1.33	1.17
Tnc	3.13E-08	9.03E-07	5.76E-01	0.58	-1.74	4.76
Bglap	3.60E-08	9.47E-07	4.91E-01	0.49	-2.04	16.18
Selenop	2.46E-07	5.92E-06	6.65E-01	0.67	-1.50	2.09
Thbs1	4.08E-07	8.68E-06	6.38E-01	0.64	-1.57	3.36
Col12a1	4.21E-07	8.68E-06	7.27E-01	0.73	-1.38	1.73
Igfbp5	1.35E-06	2.61E-05	7.53E-01	0.75	-1.33	1.43
Eno3	1.67E-06	2.91E-05	7.60E-01	0.76	-1.32	1.33
Tpm1	1.71E-06	2.91E-05	7.52E-01	0.75	-1.33	4.39
Actn3	2.08E-06	3.34E-05	8.38E-01	0.84	-1.19	1.15
Tcap	5.17E-06	7.87E-05	8.48E-01	0.85	-1.18	1.14
Ndufb7	5.85E-06	8.22E-05	7.94E-01	0.79	-1.26	1.52
Col4a2	5.97E-06	8.22E-05	7.27E-01	0.73	-1.38	1.90
Myoz1	8.07E-06	1.06E-04	8.31E-01	0.83	-1.20	1.14
Cthrc1	1.05E-05	1.32E-04	6.99E-01	0.70	-1.43	2.07
Tnnt3	1.16E-05	1.39E-04	7.82E-01	0.78	-1.28	1.49

Myh4	1.29E-05	1.50E-04	7.82E-01	0.78	-1.28	1.87
App	1.84E-05	2.04E-04	7.39E-01	0.74	-1.35	3.21
Mdh1	2.02E-05	2.15E-04	7.50E-01	0.75	-1.33	1.67
Lum	2.10E-05	2.15E-04	7.44E-01	0.74	-1.34	2.16
Atp2a1	2.16E-05	2.15E-04	8.08E-01	0.81	-1.24	1.39
Cycl	2.51E-05	2.42E-04	7.65E-01	0.77	-1.31	2.00
Mybpc2	3.35E-05	3.09E-04	8.07E-01	0.81	-1.24	1.25
Itm2c	3.42E-05	3.09E-04	7.29E-01	0.73	-1.37	2.21
Col6a2	4.58E-05	4.01E-04	7.39E-01	0.74	-1.35	3.23
Eef1a1	4.71E-05	4.01E-04	6.76E-01	0.68	-1.48	5.43
Maf	6.20E-05	5.12E-04	8.03E-01	0.80	-1.25	1.61
Ubc	7.10E-05	5.70E-04	7.97E-01	0.80	-1.25	1.71
Fn1	1.17E-04	9.12E-04	6.76E-01	0.68	-1.48	4.28
Pygm	1.23E-04	9.33E-04	8.74E-01	0.87	-1.14	1.16
Rap1b	1.44E-04	1.07E-03	8.10E-01	0.81	-1.23	1.83
Myl1	1.55E-04	1.12E-03	8.13E-01	0.81	-1.23	1.27
Tnni2	1.59E-04	1.12E-03	9.00E-01	0.90	-1.11	1.04
Ckb	1.78E-04	1.22E-03	6.71E-01	0.67	-1.49	3.43
Tln1	2.22E-04	1.49E-03	8.24E-01	0.82	-1.21	1.62
Calm1	4.06E-04	2.66E-03	8.26E-01	0.83	-1.21	1.66
Olfml2b	4.19E-04	2.69E-03	7.73E-01	0.77	-1.29	1.89
Arhgdia	4.31E-04	2.70E-03	8.06E-01	0.81	-1.24	1.63
Naca	4.40E-04	2.70E-03	8.05E-01	0.81	-1.24	2.02
Lgals3	4.84E-04	2.91E-03	8.02E-01	0.80	-1.25	1.61
Cox6a2	5.06E-04	2.99E-03	9.22E-01	0.92	-1.08	1.04
Cox5b	5.41E-04	3.13E-03	7.80E-01	0.78	-1.28	2.28
Clta	6.34E-04	3.59E-03	8.14E-01	0.81	-1.23	2.15
Vim	8.29E-04	4.59E-03	7.96E-01	0.80	-1.26	2.37
Atp5b	8.41E-04	4.59E-03	8.23E-01	0.82	-1.22	1.51

Rack1	8.80E-04	4.71E-03	7.43E-01	0.74	-1.35	6.08
Cct3	9.51E-04	4.97E-03	8.51E-01	0.85	-1.18	1.56
Psmb4	9.64E-04	4.97E-03	8.44E-01	0.84	-1.18	1.76
Marcks	9.87E-04	5.00E-03	8.07E-01	0.81	-1.24	1.71
Ckap4	1.03E-03	5.14E-03	7.92E-01	0.79	-1.26	3.09
Mxra8	1.05E-03	5.14E-03	7.95E-01	0.79	-1.26	1.95
Atp6v1e1	1.07E-03	5.17E-03	7.86E-01	0.79	-1.27	2.18
Atp5a1	1.16E-03	5.48E-03	8.17E-01	0.82	-1.22	2.29
Antxr1	1.32E-03	6.09E-03	8.25E-01	0.83	-1.21	1.61
Myh1	1.33E-03	6.09E-03	8.68E-01	0.87	-1.15	1.15
Hspg2	1.37E-03	6.17E-03	7.97E-01	0.80	-1.25	2.29
H3f3b	1.39E-03	6.20E-03	7.91E-01	0.79	-1.26	1.76
Ryr1	1.45E-03	6.35E-03	9.09E-01	0.91	-1.10	1.12
Gnas	1.49E-03	6.44E-03	7.89E-01	0.79	-1.27	4.80
Ybx3	1.66E-03	7.06E-03	8.49E-01	0.85	-1.18	1.47
Psap	1.74E-03	7.31E-03	7.55E-01	0.76	-1.32	3.69
Col3a1	1.82E-03	7.50E-03	7.66E-01	0.77	-1.31	12.52
Akr1a1	1.98E-03	8.05E-03	8.06E-01	0.81	-1.24	2.09

Supplementary Table S6. Complete differential gene list of the comparison of the two-week MDA-MB-231 soft callus and the two-week wild-type soft callus. Gene list calculated by ANOVA and filtered by p-value <0.05, false discovery rate (FDR) <0.01, and fold change at least from -1 to 1.

Gene	P-value	FDR step up	Ratio	Fold change	LSMean(MDA- 231)	LSMean(WT)
Col12a1	7.10E-09	2.05E-06	4.95E-01	-2.02	1.42	2.86
Gpx3	2.60E-08	3.76E-06	5.67E-01	-1.76	4.36	7.68
Col6a1	6.20E-08	4.93E-06	5.71E-01	-1.75	2.07	3.63
Eef1a1	6.83E-08	4.93E-06	5.25E-01	-1.90	4.13	7.86
Arf4	1.40E-07	8.09E-06	5.93E-01	-1.69	1.56	2.63
H3f3b	6.61E-07	2.86E-05	6.38E-01	-1.57	1.38	2.16
Lum	6.92E-07	2.86E-05	5.60E-01	-1.79	1.69	3.02
Col5a2	1.70E-06	5.60E-05	5.09E-01	-1.97	5.70	11.21
Col5a1	1.74E-06	5.60E-05	4.94E-01	-2.02	4.08	8.27
Mmp2	3.14E-06	9.07E-05	5.66E-01	-1.77	2.19	3.87
Itm2c	4.61E-06	1.21E-04	6.21E-01	-1.61	1.77	2.86
Sparc	5.51E-06	1.33E-04	4.85E-01	-2.06	5.87	12.10
Myh4	1.22E-05	2.60E-04	1.47E+00	1.47	2.71	1.85
Thbs1	1.26E-05	2.60E-04	5.95E-01	-1.68	3.15	5.30
Fkbp8	1.98E-05	3.81E-04	7.09E-01	-1.41	1.58	2.23
Olfml2b	2.71E-05	4.89E-04	6.50E-01	-1.54	1.38	2.12
Tgfb1	3.11E-05	5.10E-04	6.53E-01	-1.53	1.69	2.59
Actb	3.18E-05	5.10E-04	6.44E-01	-1.55	5.55	8.61
Ctsb	3.35E-05	5.10E-04	6.09E-01	-1.64	1.96	3.23
Aebp1	4.40E-05	6.36E-04	6.36E-01	-1.57	1.88	2.96
Tpt1	5.43E-05	7.47E-04	6.21E-01	-1.61	2.43	3.91
Hspg2	6.55E-05	8.60E-04	6.16E-01	-1.62	2.90	4.71
Psap	7.28E-05	9.14E-04	7.08E-01	-1.41	3.00	4.24
Col6a2	7.60E-05	9.15E-04	6.00E-01	-1.67	5.87	9.79

Cox6a1	1.07E-04	1.13E-03	7.24E-01	-1.38	1.55	2.14
Mxra8	1.09E-04	1.13E-03	6.33E-01	-1.58	1.68	2.65
Ptms	1.09E-04	1.13E-03	7.09E-01	-1.41	2.35	3.31
Serpinf1	1.09E-04	1.13E-03	6.79E-01	-1.47	1.46	2.16
Cthrc1	1.27E-04	1.27E-03	6.24E-01	-1.60	1.83	2.94
Ptp4a3	1.55E-04	1.49E-03	8.02E-01	-1.25	1.07	1.34
Ski	1.61E-04	1.50E-03	6.92E-01	-1.45	1.37	1.98
Serf2	1.77E-04	1.60E-03	7.22E-01	-1.38	1.52	2.11
Col6a3	1.92E-04	1.68E-03	6.85E-01	-1.46	3.36	4.90
Dcn	1.97E-04	1.68E-03	6.67E-01	-1.50	1.57	2.36
Tnc	2.17E-04	1.79E-03	5.94E-01	-1.68	2.13	3.59
Tnfrsf1a	2.34E-04	1.88E-03	7.29E-01	-1.37	1.64	2.25
Mylpf	2.49E-04	1.92E-03	1.44E+00	1.44	2.51	1.74
Calm2	2.52E-04	1.92E-03	7.60E-01	-1.32	2.02	2.66
Vim	2.83E-04	2.06E-03	6.53E-01	-1.53	2.82	4.32
Col3a1	2.86E-04	2.06E-03	4.43E-01	-2.26	19.44	43.88
Thbs2	3.02E-04	2.13E-03	5.28E-01	-1.89	1.88	3.56
Ctss	3.17E-04	2.16E-03	6.98E-01	-1.43	1.19	1.71
Ubc	3.21E-04	2.16E-03	7.55E-01	-1.32	1.46	1.94
Rack1	3.75E-04	2.42E-03	6.94E-01	-1.44	4.86	7.00
Myl12a	3.77E-04	2.42E-03	7.42E-01	-1.35	1.94	2.62
Gas6	3.92E-04	2.46E-03	7.55E-01	-1.32	1.14	1.51
Gnai2	4.42E-04	2.72E-03	7.11E-01	-1.41	2.14	3.01
Sem1	4.83E-04	2.91E-03	1.29E+00	1.29	2.92	2.27
Lgals3	5.11E-04	2.99E-03	7.06E-01	-1.42	2.52	3.58
Mgp	5.17E-04	2.99E-03	1.20E+00	1.20	9.44	7.88
Lman1	5.30E-04	3.01E-03	6.78E-01	-1.48	2.21	3.27
Fth1	5.78E-04	3.21E-03	7.24E-01	-1.38	6.77	9.36
Ywhaz	6.37E-04	3.47E-03	7.29E-01	-1.37	1.49	2.04

Pabpc1	6.56E-04	3.51E-03	7.48E-01	-1.34	1.36	1.82
Tln1	7.38E-04	3.87E-03	7.78E-01	-1.29	1.32	1.70
Bmp1	7.52E-04	3.87E-03	6.79E-01	-1.47	1.76	2.60
Arhgdia	7.63E-04	3.87E-03	7.60E-01	-1.32	1.58	2.08
Cd81	8.99E-04	4.42E-03	6.79E-01	-1.47	1.64	2.42
Pcolce	9.03E-04	4.42E-03	6.63E-01	-1.51	1.55	2.34
Ctsl	9.51E-04	4.58E-03	5.79E-01	-1.73	2.55	4.40
Rcn3	9.83E-04	4.66E-03	6.94E-01	-1.44	1.95	2.82
App	1.05E-03	4.89E-03	6.69E-01	-1.49	2.67	3.99
Sept2	1.24E-03	5.66E-03	7.71E-01	-1.30	1.60	2.07
Bgn	1.26E-03	5.66E-03	7.10E-01	-1.41	3.31	4.66
Tgfb1	1.27E-03	5.66E-03	7.45E-01	-1.34	1.89	2.54
Naca	1.35E-03	5.92E-03	7.09E-01	-1.41	1.80	2.53
Fn1	1.45E-03	6.26E-03	7.04E-01	-1.42	12.39	17.61
Serpinh1	1.51E-03	6.35E-03	6.05E-01	-1.65	3.01	4.98
Ssr3	1.52E-03	6.35E-03	7.14E-01	-1.40	1.79	2.50
Cd47	1.54E-03	6.35E-03	7.70E-01	-1.30	1.35	1.75
Sfpq	1.61E-03	6.52E-03	7.54E-01	-1.33	1.61	2.13
Erh	1.63E-03	6.52E-03	7.57E-01	-1.32	1.49	1.97
Akr1a1	1.65E-03	6.52E-03	7.78E-01	-1.29	1.68	2.16
Surf4	1.78E-03	6.89E-03	7.32E-01	-1.37	1.77	2.42
Ctsa	1.79E-03	6.89E-03	7.88E-01	-1.27	1.39	1.77
Id3	2.03E-03	7.62E-03	6.85E-01	-1.46	1.77	2.59
Gnas	2.04E-03	7.62E-03	6.75E-01	-1.48	3.45	5.12
Mdh1	2.06E-03	7.62E-03	7.91E-01	-1.26	1.27	1.61
Ckap4	2.39E-03	8.71E-03	6.98E-01	-1.43	2.57	3.68
S100a6	2.41E-03	8.71E-03	7.91E-01	-1.26	1.57	1.99
Lgals1	2.54E-03	9.08E-03	7.25E-01	-1.38	2.10	2.89
Slc25a5	2.65E-03	9.34E-03	7.42E-01	-1.35	1.85	2.49

Laptn4a	2.83E-03	9.69E-03	7.40E-01	-1.35	2.60	3.51
Ppib	2.83E-03	9.69E-03	7.65E-01	-1.31	1.79	2.34
Atp2a1	2.85E-03	9.69E-03	1.26E+00	1.26	1.94	1.53
Cnn2	2.97E-03	9.97E-03	7.24E-01	-1.38	1.57	2.17

Supplementary Table S7. Complete differential gene list of the comparison of the two-week MDA-MB-231 interzone and the two-week wild-type interzone. Gene list calculated by ANOVA and filtered by p-value <0.05, false discovery rate (FDR) <0.01, and fold change at least from -1 to 1.

Gene	P-value	FDR step up	Ratio	Fold change	LSMean(MDA- 231)	LSMean(WT)
Ctsl	3.93E-15	7.34E-13	1.79E-01	-5.59	4.32	24.14
Ctsd	5.08E-15	7.34E-13	3.16E-01	-3.17	1.79	5.67
Spp1	1.05E-11	1.01E-09	2.91E-01	-3.44	1.47	5.06
Cd68	1.84E-11	1.33E-09	3.74E-01	-2.67	1.38	3.67
Atp6v0e	2.37E-11	1.37E-09	4.95E-01	-2.02	2.11	4.27
B2m	4.63E-10	2.23E-08	4.45E-01	-2.25	1.63	3.65
Ctsb	7.06E-10	2.69E-08	3.66E-01	-2.73	3.81	10.41
Actb	7.45E-10	2.69E-08	5.04E-01	-1.98	10.04	19.92
Acp5	1.22E-09	3.93E-08	3.43E-01	-2.92	1.82	5.31
Apoe	2.83E-09	8.19E-08	3.16E-01	-3.16	3.01	9.53
Ckb	1.30E-08	3.35E-07	4.83E-01	-2.07	1.22	2.53
Ctss	1.39E-08	3.35E-07	3.57E-01	-2.80	2.39	6.69
Psap	8.60E-08	1.86E-06	4.10E-01	-2.44	5.00	12.18
Ctsz	8.99E-08	1.86E-06	4.69E-01	-2.13	1.88	4.00
Tnnc2	1.98E-07	3.81E-06	1.80E+00	1.80	7.43	4.12
Mylpf	3.57E-07	6.44E-06	1.79E+00	1.79	3.88	2.16
Cyba	6.18E-07	1.05E-05	5.09E-01	-1.97	1.89	3.71
Col2a1	6.62E-07	1.06E-05	2.14E-01	-4.68	13.78	64.45
Mmp9	7.19E-07	1.09E-05	4.30E-01	-2.32	1.89	4.39
Itm2b	9.29E-07	1.34E-05	5.89E-01	-1.70	3.47	5.90
Tgm2	1.15E-06	1.58E-05	5.71E-01	-1.75	1.67	2.92
Calm1	1.42E-06	1.87E-05	5.66E-01	-1.77	1.58	2.80
Eef2	1.51E-06	1.90E-05	6.16E-01	-1.62	2.92	4.73
Acta1	1.63E-06	1.96E-05	1.63E+00	1.63	12.49	7.65

Tnnt3	2.63E-06	2.98E-05	1.64E+00	1.64	3.32	2.02
Cst3	2.68E-06	2.98E-05	6.04E-01	-1.66	3.74	6.18
Grn	3.33E-06	3.56E-05	4.96E-01	-2.02	2.08	4.20
Thbs4	3.62E-06	3.73E-05	2.21E+00	2.21	4.15	1.88
Gusb	5.31E-06	5.30E-05	5.65E-01	-1.77	1.83	3.24
Gnai2	9.98E-06	9.62E-05	6.48E-01	-1.54	2.81	4.33
Mmp13	1.21E-05	1.13E-04	5.78E-01	-1.73	1.40	2.43
Tln1	1.36E-05	1.23E-04	6.50E-01	-1.54	1.47	2.27
Cdkn1a	1.58E-05	1.38E-04	5.83E-01	-1.72	1.82	3.12
Hspa5	1.91E-05	1.63E-04	6.41E-01	-1.56	2.47	3.86
Tpt1	1.98E-05	1.64E-04	6.48E-01	-1.54	3.58	5.53
Lgals3	2.09E-05	1.68E-04	4.22E-01	-2.37	3.74	8.86
Ctsa	2.36E-05	1.85E-04	5.97E-01	-1.68	1.87	3.14
Sqstm1	2.49E-05	1.90E-04	6.54E-01	-1.53	2.39	3.65
Tmsb4x	2.96E-05	2.16E-04	6.26E-01	-1.60	3.50	5.59
Sdcbp	2.99E-05	2.16E-04	6.09E-01	-1.64	1.54	2.53
H3f3b	3.44E-05	2.43E-04	6.25E-01	-1.60	2.01	3.22
Fth1	5.23E-05	3.60E-04	4.32E-01	-2.31	11.89	27.49
Myh4	5.49E-05	3.69E-04	1.75E+00	1.75	4.36	2.49
Ctsk	5.93E-05	3.90E-04	4.89E-01	-2.05	2.79	5.71
Ckm	7.86E-05	5.05E-04	1.37E+00	1.37	6.46	4.71
Igfbp7	8.20E-05	5.15E-04	6.36E-01	-1.57	8.76	13.78
Ctnnb1	1.05E-04	6.46E-04	6.93E-01	-1.44	2.33	3.37
Akr1a1	1.10E-04	6.62E-04	6.32E-01	-1.58	2.17	3.43
Ubc	1.19E-04	6.73E-04	6.52E-01	-1.53	1.92	2.94
Laptn4a	1.22E-04	6.73E-04	6.68E-01	-1.50	3.04	4.55
App	1.22E-04	6.73E-04	6.68E-01	-1.50	3.58	5.37
Gpx1	1.23E-04	6.73E-04	6.26E-01	-1.60	1.76	2.82
Eef1a1	1.23E-04	6.73E-04	6.34E-01	-1.58	5.81	9.16

Clta	1.42E-04	7.62E-04	6.76E-01	-1.48	2.18	3.22
Cox5b	1.60E-04	8.33E-04	6.68E-01	-1.50	2.22	3.33
Gpc1	1.61E-04	8.33E-04	6.41E-01	-1.56	2.68	4.18
Alpl	1.91E-04	9.70E-04	6.05E-01	-1.65	1.56	2.57
Cfl1	2.06E-04	1.03E-03	6.65E-01	-1.50	3.03	4.55
Rack1	2.41E-04	1.18E-03	7.29E-01	-1.37	6.10	8.37
Ibsp	2.73E-04	1.32E-03	7.06E-01	-1.42	1.15	1.63
Myl1	3.58E-04	1.70E-03	1.39E+00	1.39	2.40	1.73
Ywhaz	5.65E-04	2.63E-03	7.27E-01	-1.38	2.18	3.00
Eif4b	6.36E-04	2.92E-03	7.05E-01	-1.42	1.62	2.31
Ddx5	9.56E-04	4.32E-03	6.97E-01	-1.43	1.72	2.47
Atp6v1e1	1.20E-03	5.36E-03	6.92E-01	-1.45	1.74	2.51
Sdc4	1.28E-03	5.40E-03	7.06E-01	-1.42	1.96	2.78
Hbb-bs	1.29E-03	5.40E-03	1.95E+00	1.95	2.43	1.24
Pvalb	1.29E-03	5.40E-03	1.33E+00	1.33	2.39	1.80
Gja1	1.29E-03	5.40E-03	7.19E-01	-1.39	2.10	2.92
Cnn2	1.75E-03	7.22E-03	7.37E-01	-1.36	1.82	2.47
Hba-a2	1.77E-03	7.22E-03	1.81E+00	1.81	2.22	1.22
Marcks	1.82E-03	7.25E-03	7.00E-01	-1.43	1.51	2.16
Tm9sf2	1.83E-03	7.25E-03	7.23E-01	-1.38	1.65	2.29
Arhgdia	1.86E-03	7.27E-03	7.67E-01	-1.30	1.97	2.57
Gpx3	2.05E-03	7.83E-03	7.13E-01	-1.40	5.25	7.37
Hnrnpa2b1	2.06E-03	7.83E-03	7.49E-01	-1.34	2.14	2.86
Gas6	2.14E-03	8.05E-03	7.25E-01	-1.38	1.57	2.16
Eno3	2.19E-03	8.09E-03	1.42E+00	1.42	3.13	2.20
Actn3	2.24E-03	8.09E-03	1.34E+00	1.34	1.89	1.41
Slc25a5	2.24E-03	8.09E-03	7.09E-01	-1.41	2.06	2.90
Car3	2.33E-03	8.31E-03	1.61E+00	1.61	3.46	2.14
Eif4h	2.36E-03	8.33E-03	7.76E-01	-1.29	2.03	2.61

Gnas	2.47E-03	8.59E-03	7.54E-01	-1.33	4.68	6.20
Itm2c	2.50E-03	8.59E-03	7.36E-01	-1.36	2.21	3.00
Ssr3	2.57E-03	8.63E-03	7.07E-01	-1.42	1.89	2.67
Hsp90b1	2.57E-03	8.63E-03	7.65E-01	-1.31	4.03	5.27
Myl12a	2.60E-03	8.63E-03	7.26E-01	-1.38	2.65	3.65
Nadk	2.68E-03	8.72E-03	6.69E-01	-1.49	1.68	2.51
Mgp	2.68E-03	8.72E-03	4.91E-01	-2.04	2.69	5.49
BC005537	2.76E-03	8.86E-03	7.10E-01	-1.41	2.01	2.84
Tnfaip2	2.83E-03	8.98E-03	7.14E-01	-1.40	2.06	2.88
Sept2	3.13E-03	9.82E-03	7.59E-01	-1.32	2.14	2.82